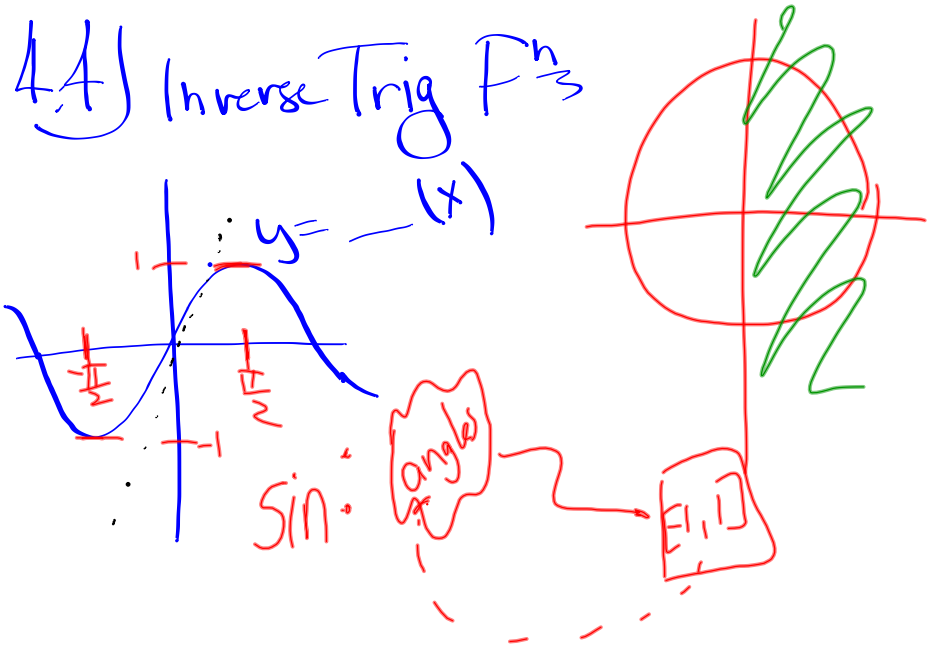
Quiz

1) Explain how the trig ratios of cosine & sine are related to the coordinates of a point on a circle centered at the origin.

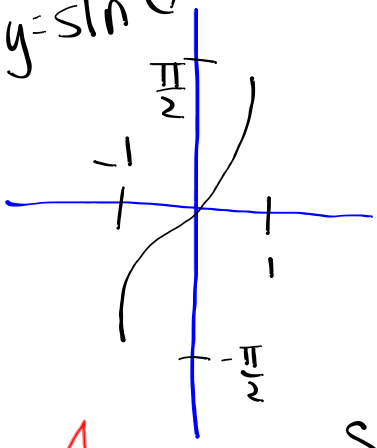
2) Use either an equilateral triangle or square to derive the values of cos & sin of the angles of a "special triangle"

3) Use the position of pts on a unit circle to determine tanθ and secθ.

# 4.4 Inverse Trig Fⁿ's




$y = \sin^{-1}(x)$




"y is the angle whose sine is x"

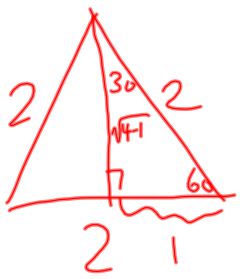


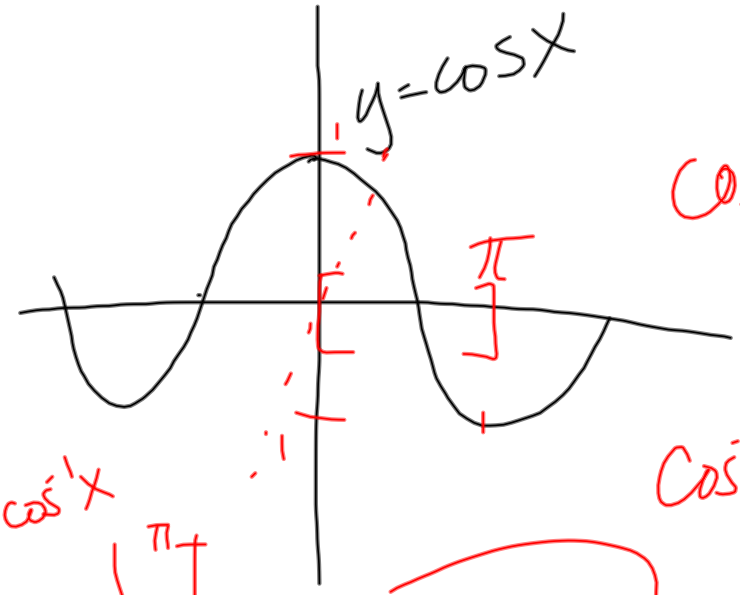
$\sin^{-1}(0) = 0$

$\sin^{-1}(1) = \pi/2$

$\sin^{-1}(-1) = -\pi/2$

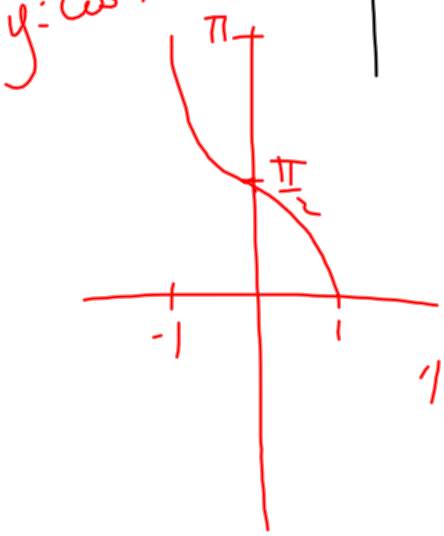
$\sin^{-1}\left(\frac{\sqrt{2}}{2}\right) = 45^\circ = \frac{\pi}{4}$






cosx: angles → [-1, 1]

cos⁻¹: [-1, 1] → angles [0, π]




$y = \cos^{-1}(x)$

"y is the angle whose cosine is x"

$\cos^{-1}(0) = \pi/2$

$\cos^{-1}(1) = 0$

$\cos^{-1}(-1) = \pi$

$\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right) = \pi - 30^\circ$

$= \pi - \frac{\pi}{6} = \frac{5\pi}{6}$

# Calculus

$$f\left(f^{-1}(x)\right) = x$$

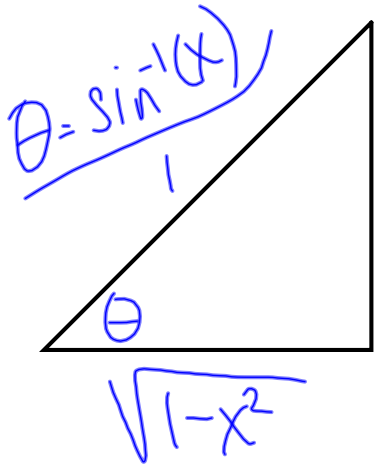
$$\left[f^{-1}(x)\right]' = \frac{1}{f'\left(f^{-1}(x)\right)}$$

2

$$\sin\left(\sin^{-1}(x)\right) = x$$

$$\cos\left(\sin^{-1}(x)\right) \cdot \frac{d}{dx}\left(\sin^{-1}(x)\right) = 1$$

$$\frac{d}{dx}\left(\sin^{-1}(x)\right) = \frac{1}{\cos\left(\sin^{-1}(x)\right)}$$




$$\cos\left(\sin^{-1}(x)\right) = \sqrt{1-x^2}$$

$$\frac{1}{\sqrt{1-x^2}}$$

graph $Y_1 = \sin^{-1}(x)$

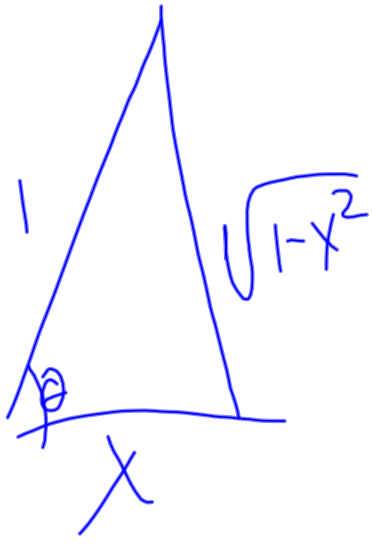
$x = .39269908$

$$\frac{1}{\sqrt{1-x^2}}$$

$$\cos(\cos^{-1}(x)) = x$$

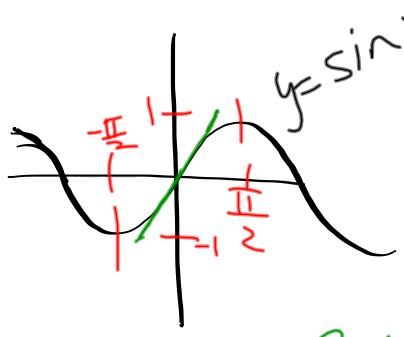
$$-\sin(\cos^{-1}(x)) \cdot [\cos^{-1}(x)]' = 1$$

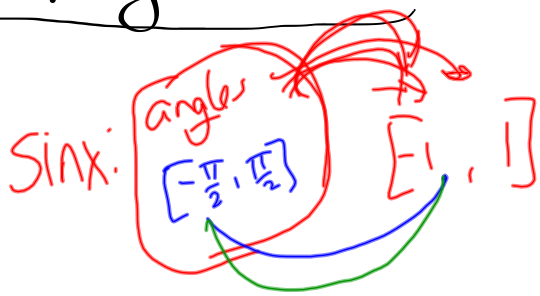
$$\frac{d}{dx}\cos^{-1}(x) = \frac{-1}{\sin(\cos^{-1}(x))}$$




$$= \frac{-1}{\sqrt{1-x^2}}$$

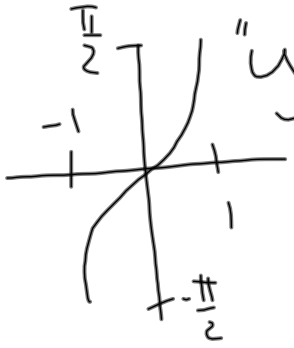
# 4.4 Inverse trig functions




| $f(x)$ | $f^{-1}(x)$ |
|---|---|
| range | domain |
| domain | range |

$\sin^{-1}(x)$: $[-1, 1]$ → $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$




"$y = \sin^{-1}(x)$"

"y is the angle whose sine is x"

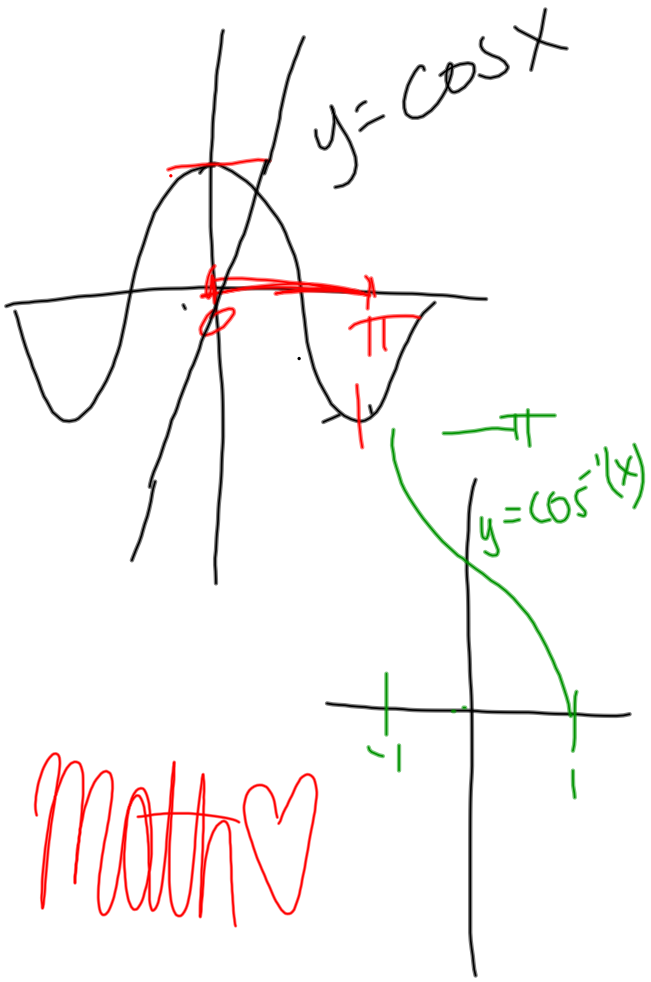
$\sin^{-1}(0) = 0$

$\sin^{-1}(1) = \pi/2$

$\sin^{-1}(-1) = -\frac{\pi}{2}$

$\sin^{-1}\left(\frac{\sqrt{2}}{2}\right) = \frac{\pi}{4}$

$\sin^{-1}(-7) =$ dne




$\cos^{-1}(0) = \pi/2$

$\cos^{-1}(1) = 0$

$\cos^{-1}(-1) = \pi$

$\cos^{-1}\left(\frac{-\sqrt{3}}{2}\right) = \pi - \frac{\pi}{6}$

$= \frac{5\pi}{6}$

Math♡

# CALCULUS

$f(f^{-1}(x)) = x$

$\sin(\sin^{-1}(x)) = x$

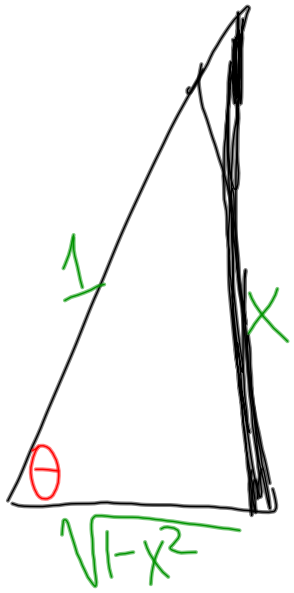
$\cos(\sin^{-1}(x)) \left[\sin^{-1}(x)\right]' = 1$

$\left[\sin^{-1}(x)\right]' = \dfrac{1}{\cos(\sin^{-1}(x))}$

Lets Learn

$\sin^{-1}(x) =$
"the angle whose sine is x"

call it $\theta$



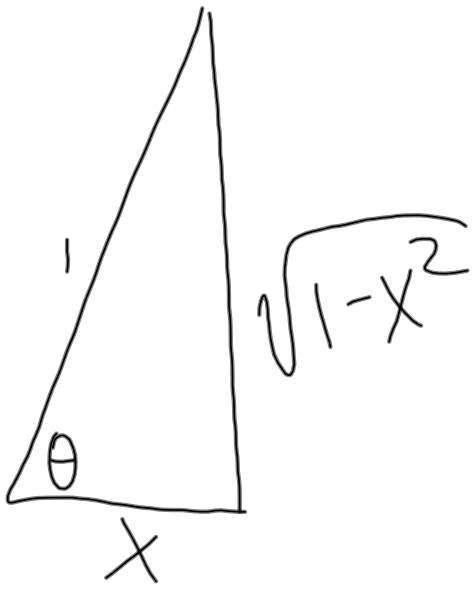

$\cos\theta = \sqrt{1-x^2}$

$\dfrac{d}{dx}\left(\sin^{-1}(x)\right) = \dfrac{1}{\sqrt{1-x^2}}$

$$\cos(\cos^{-1}(x)) = x$$

$$[-\sin(\cos^{-1}(x))][\cos^{-1}(x)]' = 1$$

$$[\cos^{-1}(x)]' = \frac{1}{-\sin(\cos^{-1}(x))}$$




$$[\cos^{-1}(x)]' = \frac{1}{-\sqrt{1-x^2}}$$